LODI CITY COUNCIL
SHIRTSLEEVE SESSION
CARNEGIE FORUM, 305 WEST PINE STREET
TUESDAY, AUGUST 18, 2009

A. Roll Call by City Clerk

An Informal Informational Meeting ("Shirtsleeve" Session) of the Lodi City Council was held Tuesday, August 18, 2009, commencing at 7:02 a.m.

Present: Council Member Hitchcock, Council Member Johnson, Mayor Pro Tempore Katzakian, Council Member Mounce, and Mayor Hansen
Absent: None
Also Present: City Manager King, City Attorney Schwabauer, and City Clerk Johl

B. Topic(s)

B-1 Electric Utility Presentation on Solar Photovoltaic Technology (EUD)

City Manager King briefly introduced the subject matter of the solar energy report.

Electric Utility Director George Morrow provided a PowerPoint presentation regarding the solar energy report. Specific topics of discussion included solar concentrating, solar photovoltaic, solar thermal "trough," sterling system, solar tower, photovoltaic history, how photovoltaic works, simple photovoltaic schematic, solar potential, photovoltaic growth, solar economics, "high gain" photovoltaic, renewable standards, California Energy Commission eligible renewables, solar in Lodi today, photovoltaic demonstration, proposals, proposed photovoltaic site near White Slough, community benefits, grapes and photovoltaic, project evaluation factors, and summary of solar energy possibilities for the City.

In response to Mayor Hansen, Mr. Morrow stated Sacramento Municipal Utility District did its project near Rancho Seco several years ago and it probably started as a demonstration of sorts.

In response to Mayor Hansen, Mr. Morrow stated concerns to surrounding property owners for reflection and aesthetics and issues of the site being along the freeway are minimal based on experts who have reviewed the proposed site.

In response to Council Member Hitchcock, Mr. Morrow stated generally these types of projects are done by private parties from the outside who provide turnkey products and take care of the permitting and operations themselves. Mr. Morrow stated the process would include request for proposals, evaluation of bids and award, a consultant is not involved at this point to evaluate bids as staff should be able to evaluate the incoming bids, the City only pays if it gets electricity which serves as the incentive for the developer to construct a good project, and it is anticipated that the City should receive a good amount of interest in the proposed project.

In response to Council Member Mounce, Mr. Morrow stated at the end of the 25-year term of the agreement, if the City has not purchased the project, the developer would need to remove everything and return the site to the original condition. Mr. Morrow stated the cost of purchasing the project is based on what the market value is at the time of sale. Mr. King stated the option to purchase is seen as a benefit to the City because it can purchase the project dependent upon what the given price is at the time of purchase. Mr. King stated prices also vary depending upon how much energy is purchased.

In response to Mayor Pro Tempore Katzakian, Mr. Morrow stated the life span of a similar

project is averaging 25 years, although some projects have certain elements that can be replaced because technology is advancing so quickly.

In response to Council Member Mounce, Mr. Morrow stated he will research and provide a ball park figure purchase price for the proposed project by the next City Council meeting in the event that the City should desire to purchase the project in five years.

In response to Council Member Johnson, Mr. Morrow stated the City is party to the green pool for Northern California Power Agency (NCPA), research is continuing into those options, and the proposed project for the City is too small for NCPA.

Discussion ensued between Mayor Hansen, Mr. King, and Mr. Morrow regarding solar projects in differing agencies and communities and the ongoing efforts to continue incorporating additional solar energy into the communities.

In response to Mayor Hansen, Mr. Morrow stated the flat panel technology works in creating energy with both direct and indirect sunlight, while high efficiency solar rays generally use focusing technology through panels.

In response to Mayor Hansen, Mr. Morrow stated State law created some solar requirements through Senate Bill 1, which also includes a rebate program. Mr. Morrow stated by 2012 buyers will have an option to include solar energy in their newly developed homes, although Roseville may have some new construction requirements for solar already because it has made significant investment and progress in the area of solar energy.

In response to Mayor Hansen, Mr. Morrow stated that, while some thought has been given to wind energy, there does not appear to be enough wind geographically in the area to sustain long-term wind energy generation.

In response to Mayor Hansen, Interim Community Development Director Rad Bartlam stated that, while there has been some interest locally in residential windmills, the idea is not prevalent due to the suggestion that a large pole and windmill be placed in the front of a home.

In response to Mayor Hansen, Mr. Morrow stated NCPA and the City, as a member of NCPA, continue to look at wind at the geothermal site and toward the northwest areas.

In response to Mayor Hansen, Mr. Morrow stated the long-term issue of concern is solar and wind storage, which continues to evolve.

In response to Council Member Johnson, Mr. Morrow stated the proposed project will take approximately two acres near the White Slough facility.

In response to Council Member Johnson, Mr. Morrow stated the proposed project will be a relatively small part of the energy usage for White Slough, although there may be potential for more in the future.

Myrna Wetzel spoke in favor of the proposed solar energy project, stating she is generally in favor of the City utilizing solar energy.

C. Comments by Public on Non-Agenda Items

None.

D. Adjournment

No action was taken by the City Council. The meeting was adjourned at 7:56 a.m.

ATTEST:

Randi Johl
City Clerk

B-1

CITY OF LODI
COUNCIL COMMUNICATION

AGENDA TITLE: **Electric Utility Presentation on Solar Photovoltaic Technology (EUD)**

MEETING DATE: **August 18,2009**

PREPARED BY: **Electric Utility Director**

RECOMMENDED ACTION: Receive presentation by the Electric Utility Director regarding the status of solar photovoltaic technology and the potential for demonstrating such technology at a City-owned facility.

BACKGROUND INFORMATION: Significant world-wide progress has been made over the last five years toward making solar energy resources a viable electric utility scale resource technology.

Solar photovoltaic technology is one which uses silicon semiconductor material to produce electricity. Typically, two types of silicon (P type and N type) are sandwiched together in a flat plate solar panel creating a collector that is sensitive to sunlight. When light (photons) strikes a solar panel, electrons are displaced from the silicon atoms and flow if the panel is part of a closed circuit. The flowing electrons create a direct "DC" electrical current. The DC current is transformed into alternating current "**A C** through use of an inverter.

Photovoltaic cells are most oflen mounted at an angle and face south in order to capture the maximum amount of direct sun. To increase output (at a higher installed cost), solar cells can also be placed on tracking systems that follow the sun to maximize the amount of solar energy captured. Another type of solar array is one designed to concentrate sunlight. These concentrating collectors use a lens or a glass reflecting surface to concentrate more sunlight onto the silicon cells.

Staff is proposing that the City solicit proposals for the installation, operation and maintenance of a relatively large scale solar project at its White Slough Water Treatment Control Facility (see attached map). Some of the benefits of such a project include:

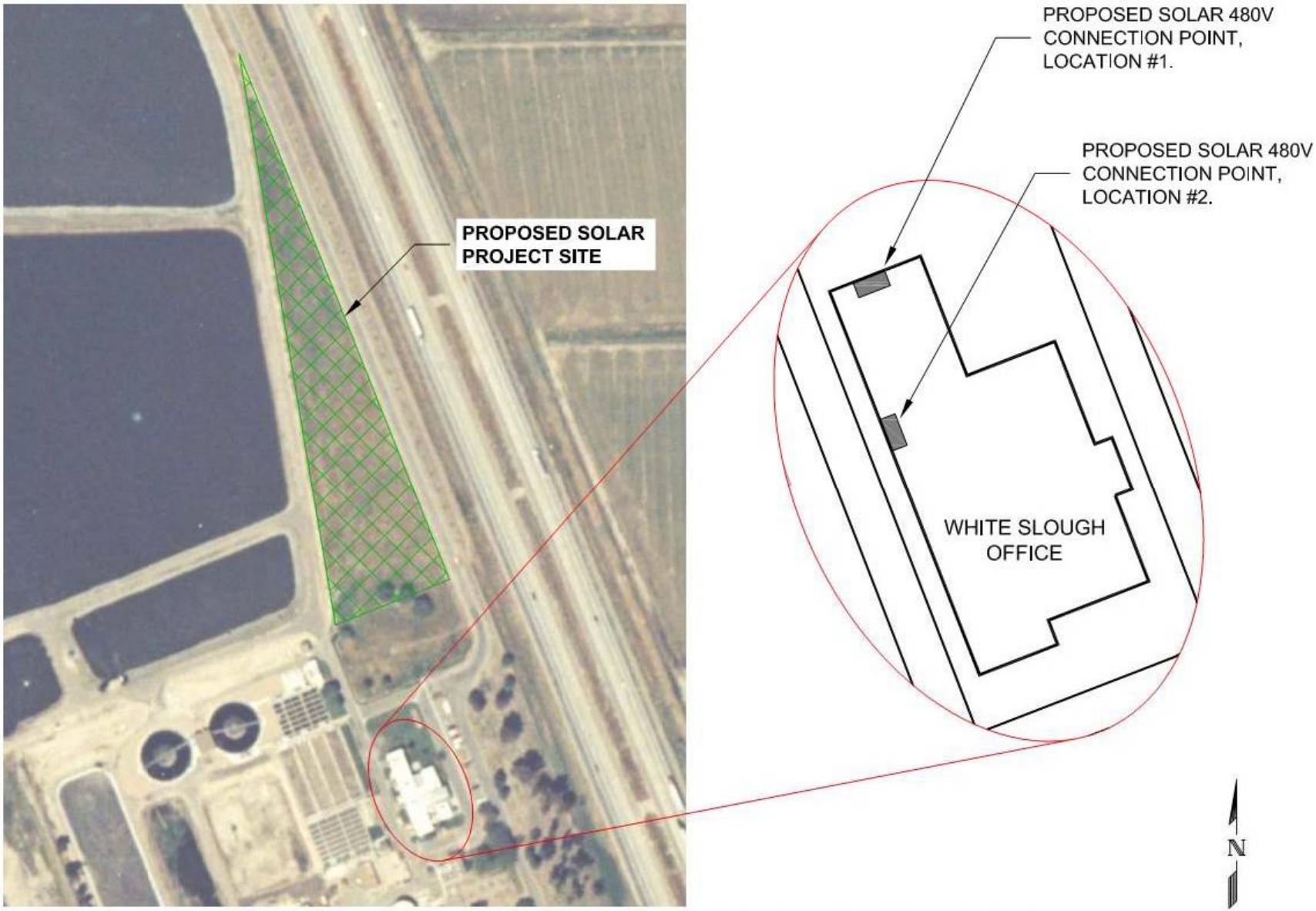
- Showcasing a renewable energy project at a site adjacent to and visible from Interstate 5;
- Obtaining experience with solar energy technology;
- Exploring the economics of solar energy systems available today;
- Helping to demonstrate innovative renewable energy technologies and promoting eventual product commercialization and enhanced economics; and
- Enhance Lodi's reputation as a community welcoming new green businesses.

Staff feels the Council may particularly be interested in the field of green jobs and green manufacturing. The Governor has stated on a number of occasions that green jobs will be a significant source on new employment. We have an interest in increasing our visibility as a community open to green jobs. **A** viable solar project will help in this regard.

APPROVED: _____
Blair King, City Manager

Further background on solar photovoltaic technology and its potential demonstration at a City-owned facility will be provided at the meeting.

George F. Morrow
Electric Utility Director



PROPOSED SOLAR PROJECT SITE

WHITE SLOUGH WATER POLLUTION CONTROL PLANT

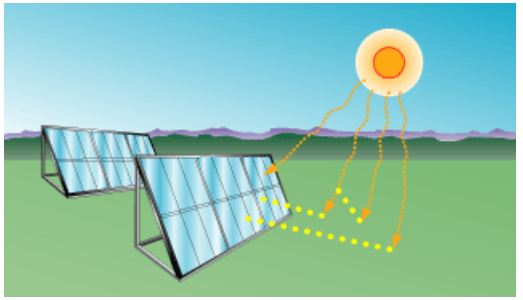
Lodi Electric Utility

Solar Energy Report

City Council Shirtsleeve
August 19, 2009

Solar Technologies

- Solar Concentrating (Thermal)
  - Trough
  - Dish/Sterling
  - Power Tower



- Solar Photovoltaic
  - Wafer-based Crystalline Silicon
  - Thin Film
  - Concentrating

Solar Thermal “Trough”

Sterling System

Solar Tower

Solar One in Daggett, California

Solar Photovoltaics

SMUD's 2 megawatt solar plant near Rancho Seco

Solar Photovoltaics

- Photovoltaic (“PV” for short) is the word that describes converting sunlight into electricity
- “Photo” means pertaining to light
- “Voltaic” means producing voltage

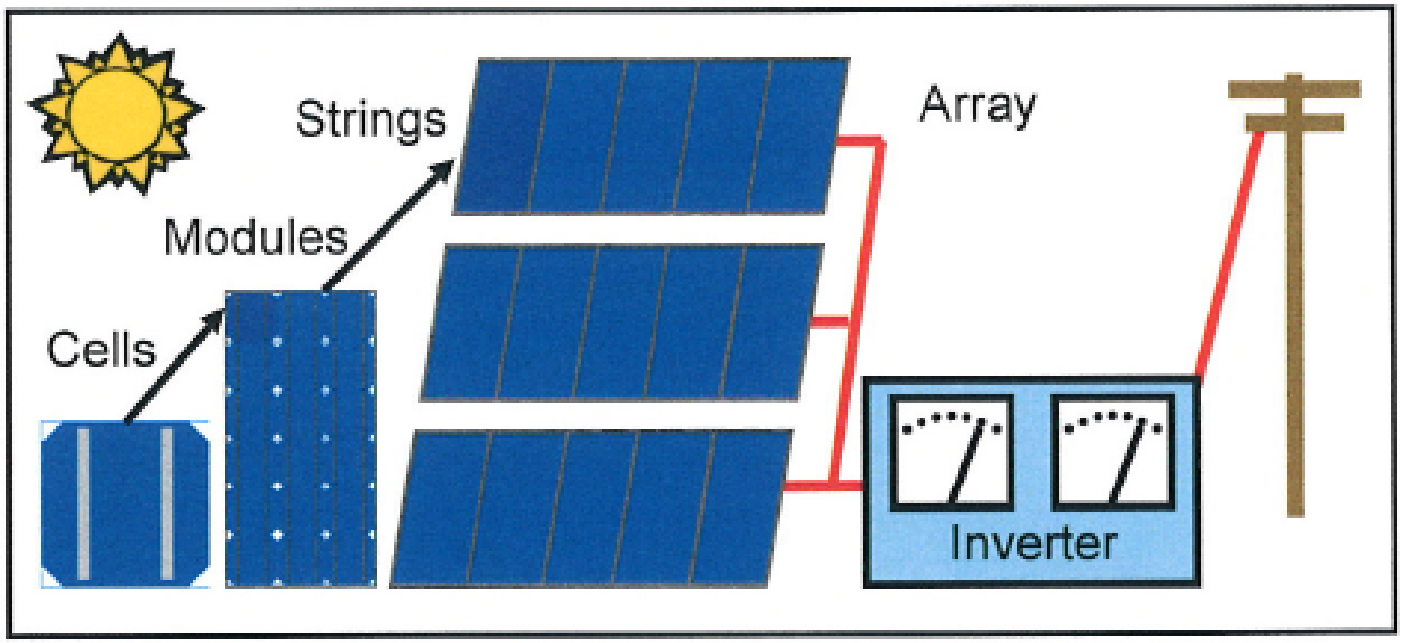
PV History

- In 1839, Alexandre Bacquerel discovered that certain materials produced small amount of current when exposed to sunlight
- In 1876, William Adams discovered that a solid material - selenium – produced electricity from light. Only 1-2% efficient
- In 1954, Bell Lab scientists patented a way to make electricity from silicon-based cells
- In 1955, the first commercial PV product was announced. 2% efficient, $1785 per watt
- By mid-1960's, PV efficiency neared 10 percent
- In the 60's and 70's, the Space Program greatly accelerated PV development

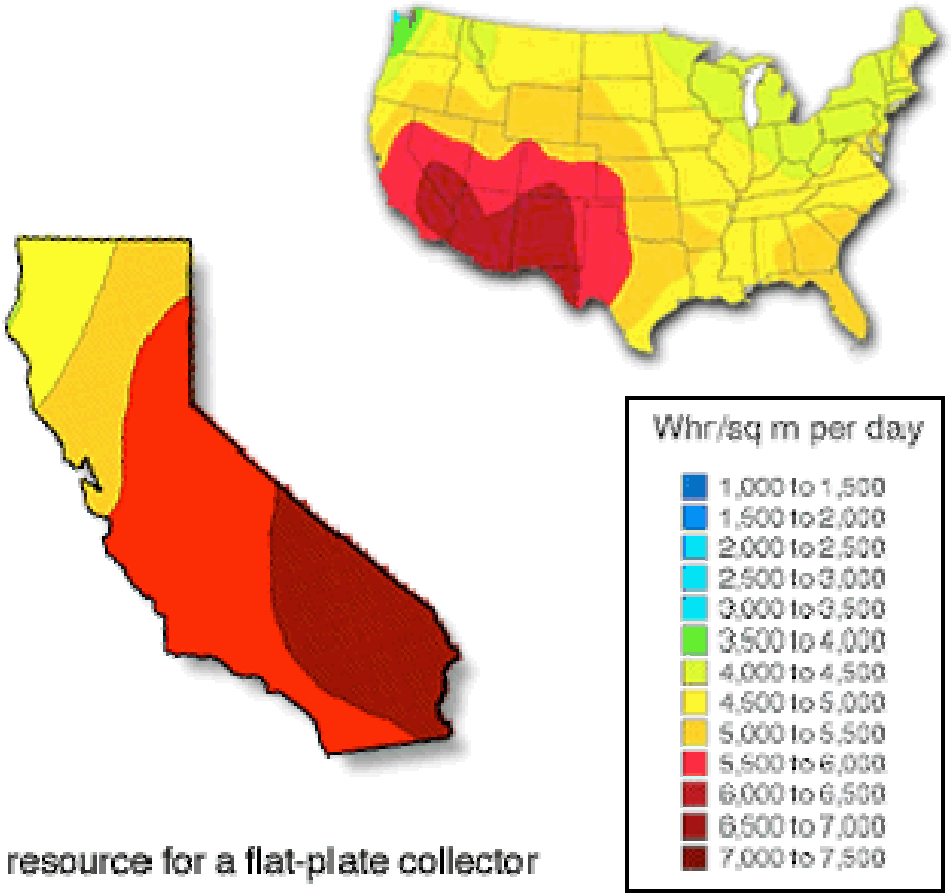
How Does PV Work?

- Sunlight is made of photons (particles of solar energy)
- Typically, two types of silicon (P type and N type) are sandwiched together in a solar panel
- When light (photons) strike a solar panel, electrons are displaced from the silicon atoms creating a flow or electric current
- The resulting current is direct current (DC) which can be converted to alternating current (AC) with an inverter
- PV cells are mounted at an angle and face south in order to increase amount of sunlight captured
- Tracking systems and concentrating mirrors can be used to sunlight levels.

Simple PV Schematic



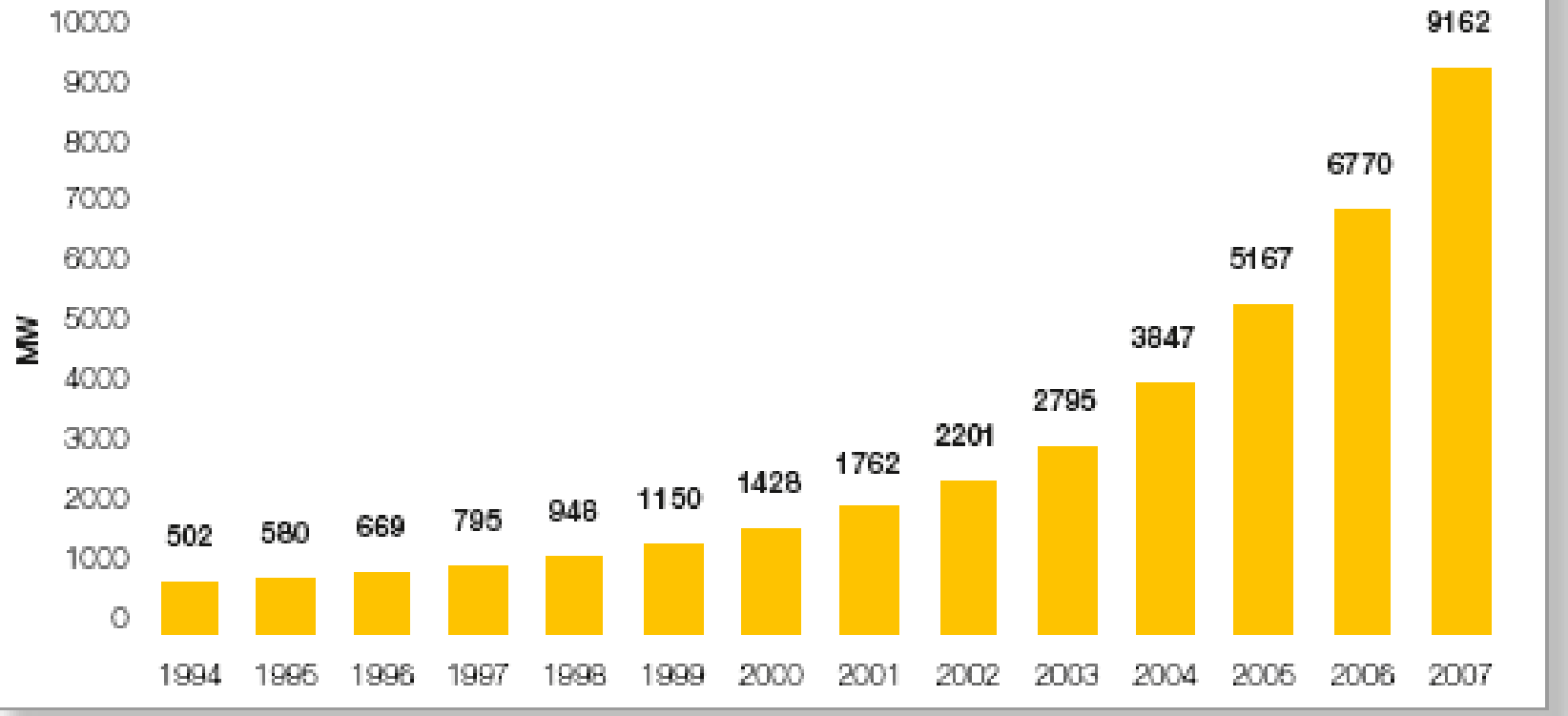
Solar Potential



Solar resource for a flat-plate collector

PV Growth

Figure 2.1: Global cumulative PV capacity



Solar Economics

- Prices for new PV solar energy vary but generally in the 12 to 20+ cents per KWH range
- Pricing still on the high side compared to other electric technologies
- Energy is high value since typically level of sunlight correlates well with electric demand/prices

- Impact of solar “transients” may be problematic from an electric system operations standpoint once solar penetration levels increase.

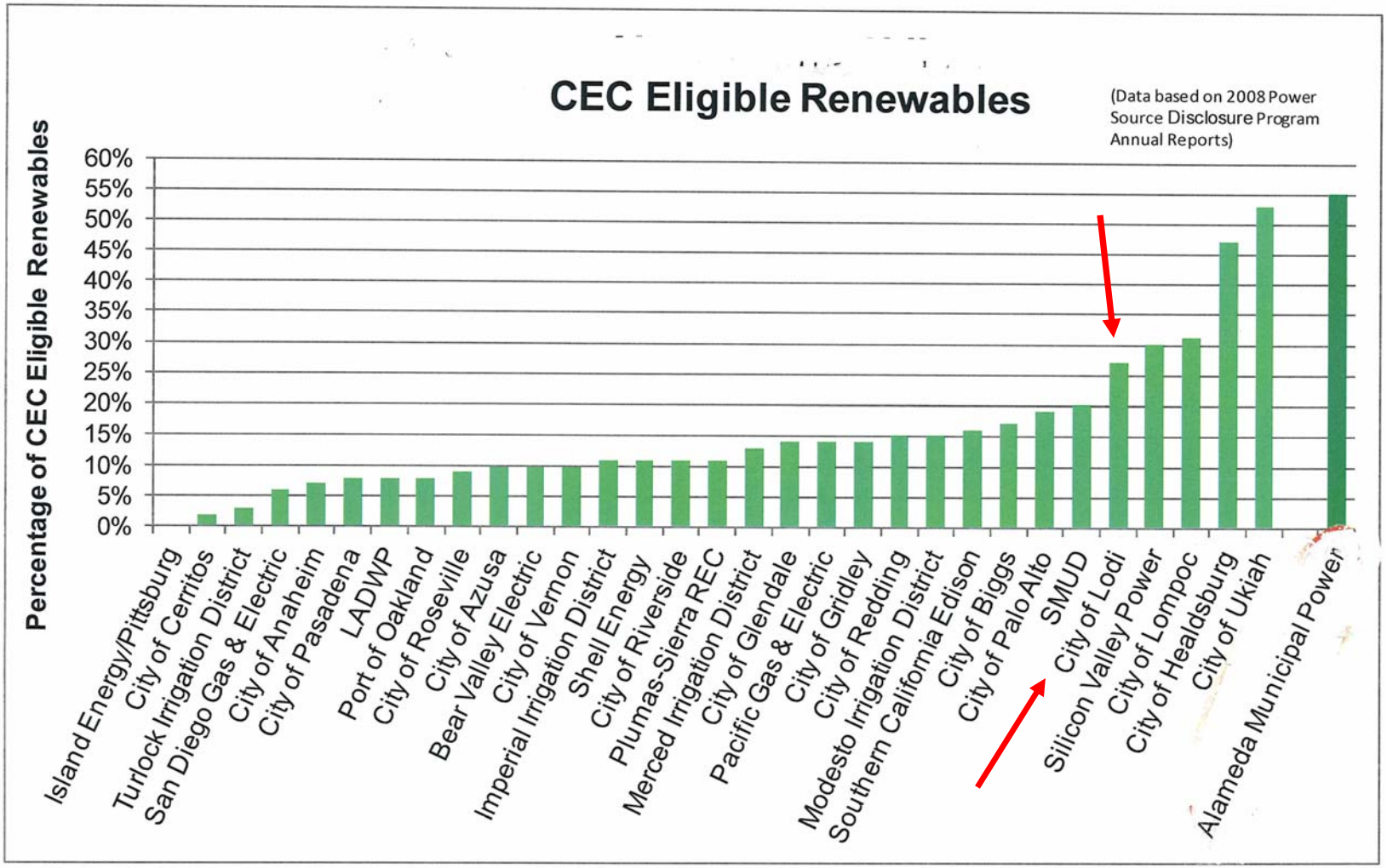
“High Gain” PV

Renewable Standards (RPS)

- Current law requires private electric utilities to be 20% renewable by 2010
- Pending state legislation proposes to increase RPS to 33% by 2020.
- Lodi is approximately 25% qualified renewable

PG&E	11.9%
SCE	15.5%
SDG&E	6.1%

REC Status


CEC Eligible Renewables
(Data based on 2008 Power Source Disclosure Program Annual Reports)
Percentage of CEC Eligible Renewables
60%
55%
50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
Island Energy/Pittsburg
City of Cerritos
Turlock Irrigation District
San Diego Gas & Electric
City of Anaheim
City of Pasadena
LADWP
Port of Oakland
City of Roseville
City of Azusa
Bear Valley Electric
City of Vernon
Imperial Irrigation District
Shell Energy
City of Riverside
Plumas-Sierra REC
Merced Irrigation District
City of Glendale
Pacific Gas & Electric
City of Gridley
City of Redding
Modesto Irrigation District
Southern California Edison
City of Biggs
City of Palo Alto
SMUD
City of Lodi
Silicon Valley Power
City of Lompoc
City of Healdsburg
City of Ukiah
Alameda Municipal Power

Solar in Lodi Today

- **Residential**
  - 25 Systems
  - 105 kilowatts total
- **Commercial**
  - 11 Systems
  - 475 kilowatts total

Clark Pest Control	166 KW
Dependable Precision	132 KW
Plug-It Products	73 KW

Note: Lodi Electric Utility has rights in ~200 KW of solar installed at the Geysers and operated by NCPA

Lodi PV Demonstration

- Staff is proposing a PV demonstration project at a Lodi City facility
- White Slough Water Treatment Facility
- Qualifies for EUD's California Solar Initiative Rebate (presently $2.60 per watt)
- Goal to be a "showcase" project with community benefits

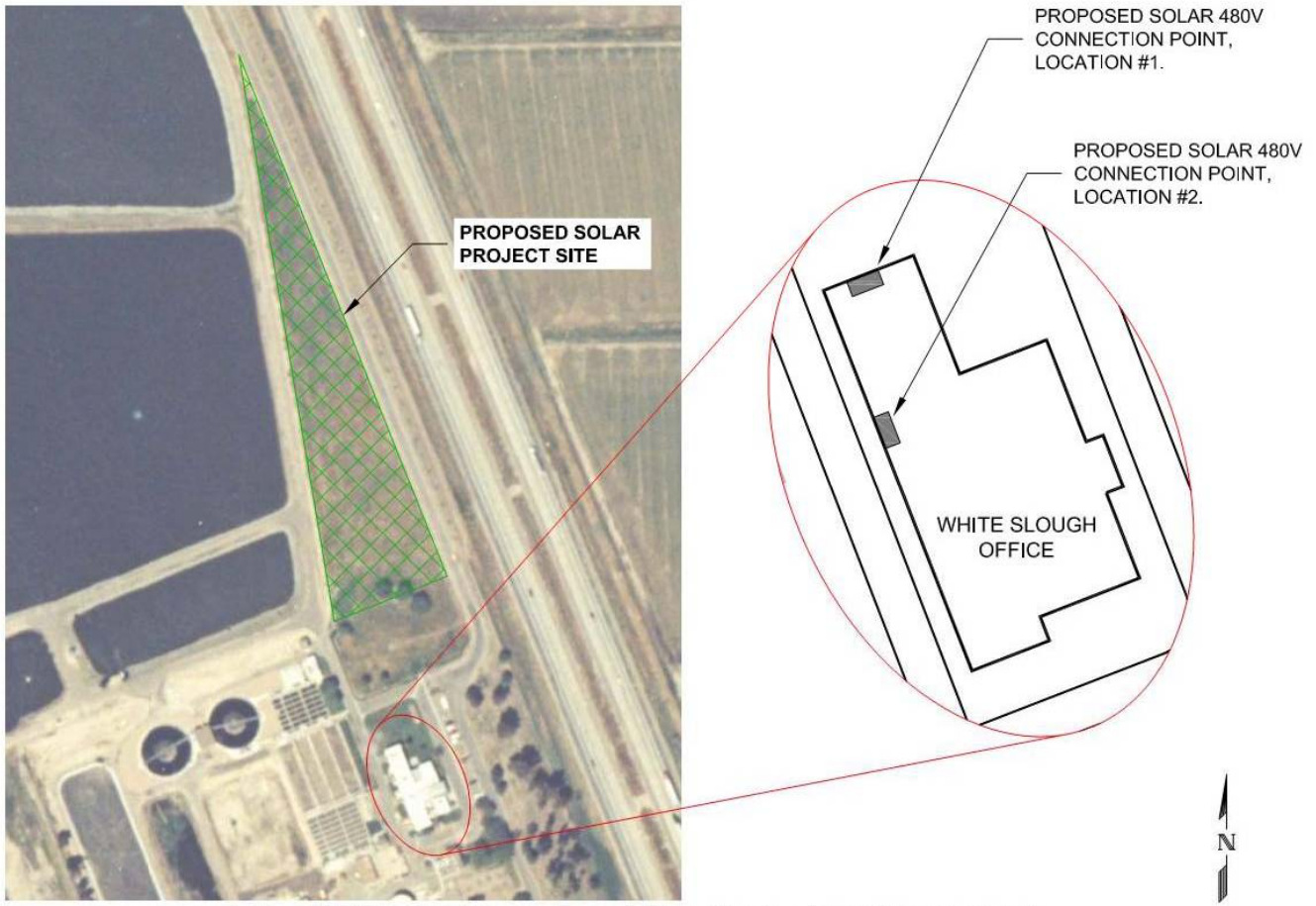
Proposals

- Must use photovoltaic technology
  - Fixed or tracking
  - Flat panel or reflecting
- Turnkey projects
- City to provide land
- In-service by June 1, 2010
- 25 year term with option for City to purchase system after 5 years
- Minimum 100 KW. Maximum is site dependent

Proposals (cont)

- Purchases made under Purchase Power Agreement (PPA)
- Preferred pricing of flat ¢/KWH with annual escalation, if needed
- EUD to receive all GHG, RPS and capacity attributes/credits
- Wastewater division to retain solar rebate
- Project will comply with EUD's metering and interconnection requirements.

Proposed PV Site



PROPOSED SOLAR PROJECT SITE

WHITE SLOUGH WATER POLLUTION CONTROL PLANT

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Community Benefits

- Visibility of project and signage from I-5
- Promoting Lodi as a “green friendly” to new or relocating businesses in that sector
- Potential for future addition of new jobs
- Use of Lodi materials and labor on solar project where practical
- Providing societal value by demonstrating and supporting innovative technologies
- Reduction of green house gases

Grapes and PV

Project Evaluation Factors

- Award based on project evaluated to be in the best interest of City
- Pricing and economic impact of energy purchase
- Innovativeness and efficiency of proposed solar PV technology
- Experience and capability of bidder
- Buy-out option terms
- Other Purchase Power Agreement terms
- Proposed community benefits

Summary

- Solar energy is rapidly becoming a viable electricity producing technology
- Presently, residences and businesses have installed over 500 KW of PV solar
- Proposed solar demonstration project at White Slough would be first solar at City facility (other than EUD vehicle charging)
- Site would be highly visible from I-5 and promote Lodi as “green friendly”

Questions/Comments?